

Regenerative medicine and clinical application in Medical 3D printing

Targeted call: HORIZON-HLTH-2023-TOOL-05-01: Clinical trials of combined Advanced Therapy Medicinal Products (ATMPs).

The Department of Biomedical Engineering and Measurement at the Technical University of Košice (TUKE) focuses on the design and medical production of personalized implants and scaffolds using 3D printing and bioprinting. Currently, the Biomedical Engineering company is developing a new generation of innovative implants for regenerative medicine with the promise of their early clinical adaptation and use within hospitals, as they count with ISO13485 certified facilities. Recently over 350 PSIs were designed, manufactured, verified, and clinically applied in Slovakia, the Czech Republic, India, Brazil, Ukraine, Croatia, Argentina, Spain, and the U.S.

Main project ideas

- *Clinical testing of Patient-specific resorbable implants e.g., a spinal implant, tracheal, cranial*
- *Clinical trials of ATMPs combined with scaffolds from resorbable and permanent biomaterials*
- *Medical production adjustment, and optimization connected with validation and certification*

What we bring into a consortium

- Knowledge of soft and hard tissue implant design and additive manufacturing from medical grade materials PCL, Titanium, PEEK, and innovative materials PDA, PPSU, and PLA/PHB. These materials might be integrated with cells, as a combined ATMP.
- Provide software and hardware solutions by setting up and optimizing required parameters in the pre-processing of 3D bioprinting for a new type of materials.
- Expertise in biomedical engineering, prosthetics and orthotics, general mechanical engineering, mechatronics, and measurements, 3D scanning, and medical certification.

Collaborations

- Industrial: TRILAB – PRUSA Research, Materialise, EOS, CSEM, Chalmers University, AUTODESK.
- Clinics: L.P. University Hospital Košice, University Hospital Martin, University Hospital Bratislava, Agel Hospital, Masonic Hospital.

Recent related projects

OPENMED (ITMS2014+: 313011V455)

An open scientific community for modern interdisciplinary research.

CEMBAM (ITMS+: 313011V358)

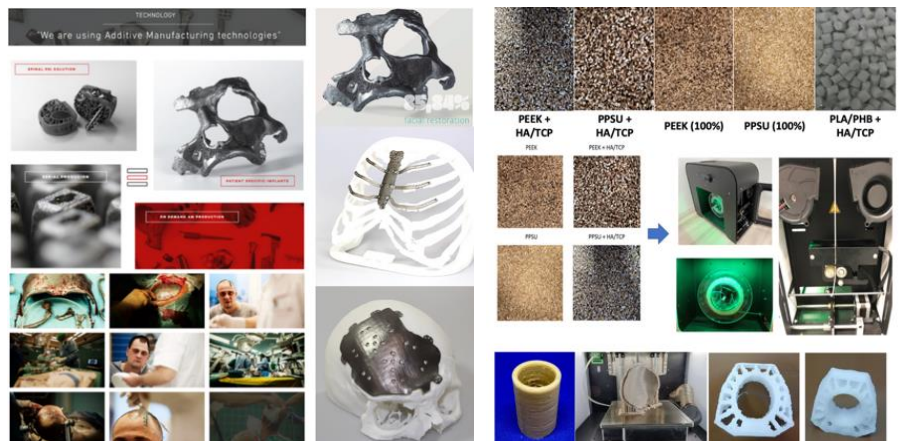
Centre for medical bioadditive research and production.

CPT ZOPA (ITMS2014+: 313011W410)

Centre for Advanced Therapies of Chronic Inflammatory Diseases.

APVV (SK-CZ-RD-21-0056)

Bioresorbable materials for additive manufacturing of vessel substituents and their biomechanical characterization.



Portfolio of personalized titanium implants produced using additive technology and medical filament extrusion process, materials and 3D printed implants (aortic model, personalized Cranial implant from PEEK and personalized cage)

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